lar repairs are then made using #10-0 or #11-0 nylon sutures under 16 to 25 powers of magnification. Vein grafts are used to bridge vascular defects resulting from crush or avulsion injuries. At the same time, nerve repairs, bone stabilization and tendon repairs are carried out. Postoperative care includes the use of intravenous dextran, occasional heparinization and orally given aspirin. This technique has also been applied to replantation of avulsed scalps, and to transplantation of digits, such as thumb reconstruction by free transfer of a great toe.

Microvascular surgical procedures may benefit those patients with congenital or acquired deformities in whom more classical reconstructive procedures are not applicable or have failed. Full thickness flaps of tissue based on known arterial supply have been successfully transferred by microanastomoses of small arteries and veins. The free groin flap is used commonly in this type of reconstruction and has been employed in the reconstruction of upper and lower extremity soft tissue defects, in repair of facial defects and in breast reconstruction following mastectomy. The groin flap is based upon the superficial circumflex iliac artery. Its course may be preoperatively mapped with a Doppler probe. If suitable recipient vessels can be isolated at the site of proposed reconstruction, the flap can be transferred and anastomoses carried out under magnification.

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REFERENCES

O'Brien BM: Microvascular Reconstructive Surgery. Edinburgh, London and New York, Churchill Livingstone, 1977

O'Brien BM: Replantation surgery. Clin Plast Surg 1:405-426, Jul 1974

Soft Tissue Augmentation With Injectable Collagen

LONG-TERM SOFT TISSUE AUGMENTATION has been achieved by injection of a modified xenogeneic collagen. Studies in rats and rabbits have indicated acceptance of both allogeneic and xenogeneic collagen from human, bovine, rat and rabbit donors. Human clinical trials have been in progress for more than a year.

Dermal collagen is made soluble by controlled digestion with pepsin, a procedure known to reduce antigenicity by removal of nonhelical terminal extensions of the molecule. After purification, an extrudable collagen gel is prepared in physiologic buffer.

After subcutaneous injection the collagen polymerizes as a firm white gel. Within hours there is a pleocytotic reaction. By three days this evolves to fibroblastic colonization and subsequent vascularization of the injected collagen. Over two to twenty weeks, the cellular and vascular distribution approaches the appearance of dense, but clinically soft, connective tissue. Scanning electron micrographs show randomly arrayed, small diameter collagen fibers.

A clinical study of soft tissue augmentation by allogeneic and xenogeneic (bovine) collagen injection has been carried out in 28 patients involving more than 600 individual injections. Contour defects or depressed scars were due to acne, trauma or subcutaneous atrophy; and injections were both intradermal and subdermal. Of 28 patients, there was moderate to pronounced improvement in 24, with follow-up periods exceeding one year. Complications include one allergic reaction and two instances of cellulitis.

Pepsin-modified xenogeneic collagen appears, therefore, to be a promising biomaterial for long-term tissue augmentation.

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REFERENCES

Knapp TR, Luck E, Daniels JR: Behavior of solubilized collagen as a bioimplant. J Surg Res 23:96-105, Aug 1977

Knapp TR, Kaplan EN, Daniels JR: Injectable collagen for soft tissue augmentation. Plast Reconstr Surg 60:398-405, Sep 1977

Treatment of Basal Cell Carcinoma

BASAL CELL CARCINOMA of the skin is the most common and, at times, one of the most frustrating of skin tumors. It occurs most often in persons over 40 years old and has many causes. It is seen most frequently on the head and neck and other exposed areas of the body. The choice of treatment of basal cell carcinoma depends on the type, size and location of the lesion, as well as the age and health of the patient. Previous treatment must be kept in mind when managing recurrent lesions.

The superficial and early ulcerated lesions respond well to a variety of treatments. Electrodesiccation and currettage, liquid nitrogen, chemotherapy with 5-fluorouracil, radiation and surgical excision have been used. Methods which produce a specimen for pathologic study and determination of tumor-free margins are preferred.

Nodular basal cell carcinoma is less invasive than the ulcerated variety and can be completely excised surgically without difficulty if treated early. The morphea or sclerosing types have very

poorly defined borders and show a higher incidence of recurrence than other varieties. Large and advanced lesions are best treated with wide surgical excisions coupled with reconstruction using local or nearby tissues. Mohs' chemosurgical technique for excision of basal cell carcinoma is receiving renewed interest at present. The complexity and, in some cases, the pain and final scarring limit this approach to the difficult and recurrent tumor.

It is doubtful that a cure can be achieved in patients where deep structures, such as cartilage and bone are involved, but local control usually can be achieved by a combination of surgical excision and radiation. The occasional far-advanced, nonresectable tumor can be palliated with systemic chemotherapy. Results using this technique may last for as long as a year to a year and a half.

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REFERENCES

Paletta FX, Converse JM, McCarthy JG: Reconstructive Plastic Surgery, chap 65. Philadelphia, W. B. Saunders Company, 1977, pp 2817-2839

Popkin GL, Defeo CP Jr, Androtti R, et al: Cancer of the Skin, chap 35. Philadelphia, W. B. Saunders Company, 1976, pp 821-844

Mohs FE: Chemosurgery for skin cancer: Fixed tissue and fresh tissue techniques. Arch Dermatol 112:211-215, Feb 1976

Progress in Synthetic Implants for Postmastectomy Reconstruction

WOMEN WHO HAVE undergone radical, modified radical or simple mastectomy for breast cancer are seeking reconstruction of their deformity in increasing numbers. The results of these reconstructive surgical procedures have improved greatly and the operative steps have decreased with the increased popularity of the modified radical mastectomy and preservation of the pectoral muscle.

Silastic implants are the technique of choice in replacing the missing glandular and adipose tissue, and muscle when necessary. Since their introduction by Cronin and Gerow in 1964, modifications and improvements of synthetic implants have been numerous. Today reconstructive surgeons have a choice of several different types of prosthesis implants, either standard or custom-made for each patient.

The original smooth silastic implant had Dacron® patches for fixation of the implant to the chest wall. These fixation patches have been found to be unnecessary and are seldom used today. Smooth silastic implants come in a variety of shapes and sizes, and are either prefilled with silastic gel or are filled at the time of operation with physiologic saline or dextran. There is also a saline-gel implant which has a central gel-filled compartment and an outer inflatable compartment. Both compartments vary in size. All these implants also can be covered with polyurethane foam, which many surgeons consider desirable because it gives a softer surface for the skin flaps and appears to discourage scar formation.

Today reconstruction of postmastectomy deformities can be done with a high degree of patient satisfaction. This has been made possible by the development of new and improved synthetic implants.

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REFERENCES

Hohler H: Reconstruction of the female breast after mastectomy, *In* Converse JM (Ed): Reconstructive Plastic Surgery—Vol 7. Philadelphia, Saunders, 1977, pp 3710-3723

Snyderman RK: Reconstruction of the breast after surgery for malignancy, *In* Goldwyn RM (Ed): Plastic and Reconstructive Surgery of the Breast. Boston, Little, Brown and Company, 1976, pp 465-479

Myocutaneous Flaps

ONE OF THE most exciting innovations in reconstructive surgical procedures is the development of myocutaneous flaps. These are compound flaps of skin and muscle which can be elevated when the vascular pedicles supplying a muscle also provide perforating vessels from the surface of the muscle to its overlying skin. Such a myocutaneous vascular unit will survive completely even when elevated as an island flap when its blood supply remains intact.

Credit for this advance belongs to McCraw and his associates, who have shown the clinical application of myocutaneous flaps based on the trapezius, latissimus dorsi, biceps femoris, rectus abdominis, sacrospinalis, rectus femoris, gracilis, sartourius and gastroenemius muscles.

Myocutaneous flaps have several advantages over most random skin flaps. First, they may be elevated and transferred without a delay. Second, the muscle provides bulk and padding. Third, the excellent blood supply allows for design of remarkably versatile and safe flaps which are unlikely to undergo necrosis. These features have made these flaps especially valuable for providing coverage for difficult surgical problems such as radiation dermatitis; breast reconstruction following mastectomy; chest and abdominal wall defects; penile and vaginal reconstruction; myelomeningoceles, and open tibial fractures.

It should be recognized that although most skin areas are supplied by perforating vessels from